REMARKS

In the Office Action, the Examiner rejected claims 1 and 3-21 under 35 U.S.C. §101. The Examiner also rejected claim 1 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. The Examiner also rejected claims 1, 11, 20 and 21 under 35 U.S.C. §102(b) as being anticipated by Trimberger (U.S. Patent 5,959,881). The Examiner also rejected claims 3-7, 10, and 12-17 under 35 U.S.C. §103(a) as being unpatentable over Trimberger, as applied to claims 1 and 11, in view of Pedersen et al. (U.S. Patent 6,134,705, hereafter "Pedersen"). The Examiner also objected to claims 8-9 and 18-19 as being dependent on a rejected base claim.

In this Amendment, Applicants have amended claims 1 and 3-21. Applicants have amended claims 1 and 3-21 for reasons of clarity and not for reasons of patentability. Applicants do not surrender any equivalents of any amended limitations. Applicants have added new claims 22-23. Accordingly, claims 1 and 3-23 will be pending after entry of these Amendments.

I. Rejection to Claims 1 and 3-21 under 35 U.S.C. § 101

In the Office Action, the Examiner rejected claims 1 and 3-21 under §101 because the claimed invention was directed to non-statutory subject matter. Applicants have amended claims 1 and 3-21 to add that the data storage structure is encoded within a computer-readable medium. Three arguments for acceptance of the claims as amended are below.

First, Applicants respectfully submit that claims 1 and 3-21 now recite a limitation that establishes a physical relationship between the data storage structure, the record management system, and the underlying computer hardware, which is a real world object. MPEP §2100-11 states that data structures are functional descriptive material. The functional descriptive elements

of data structures were defined in *In Re Lowry*, 32 F.3d 1579, 1583 (1994). Therein, the court found that data structures contain both "information used by application programs and information regarding their physical interrelationships within a memory. Lowry's claims dictate how application programs manage information. Thus, Lowry's claims define functional characteristics of memory." *Id.*

Furthermore, "[w]hen functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized." *See*, MPEP §2100-12; *See also,* MPEP §2100-13. Similarly, a record management system encoded within a computer-readable medium comprised of data storage structure encoded within a computer readable medium also shares the structural and functional interrelationships with the hardware components of the computer system. Therefore, claims 1 and 3-21 are structurally and functionally interrelated to the medium and are directed to statutory subject matter.

Second, Applicants respectfully submit that the claimed data storage structure and the record management system are not merely abstract data structures or abstract methodologies, but rather are physical components that provide useful, concrete, and tangible results. A claim is patentable under §101 if "the claimed invention as a whole [*sic*] accomplish[es] a practical application." *State St. Bank & Trust Co. v. Signature Fin. Group*, 149 F.3d 1368, 1373, 47 USPQ2d 1596, 1601-02 (Fed. Cir. 1998). That is, the claimed invention must produce a "useful, concrete and tangible result." *Id.*

The data storage structure and record management system are physical entities in the sense that they provide increased efficiency in computer operation and IC implementation. *See*,

In Re Lowry, 149 F.3d at 1584, "data structures simultaneously represent complex data accurately and enable powerful nested operations. In short, Lowry's data structures are physical entities that provide increased efficiency in computer operation". The claimed data storage structure and the claimed sub-network record management system provide tangible benefits such as permitting the efficient access to, storage of, management of, and the deletion of the sub-networks used in the implementation of a circuit design. Applicants respectfully submit that a computer-readable medium encoded with a data storage structure that stores a group of sub-networks and the sub-network record management system for the data storage structures produce useful, concrete, and tangible results. Accordingly, Applicants respectfully request reconsideration and withdrawal of the §101 rejection of claims 1 and 3-21.

II. Rejection to Claim 1 under 35 U.S.C. § 112, Second Paragraph

In the Office Action, the Examiner rejected claim 1 under §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. Specifically, the Examiner stated that claim 1 recited a data structure for storing sub-networks without reciting the claim elements for particularly pointing out the subject matter of the invention.

Applicants respectfully disagree and traverse the rejection in light of Applicants' specification which clearly defines the bounds and elements of claim 1. Courts have stated "the standard for assessing whether a patent claim is sufficiently definite to satisfy the statutory requirement as follows: If one skilled in the art would understand the bounds of the claim when read in light of the specification, then the claim satisfies section 112 paragraph 2." *Exxon Research & Engineering Co. v. United States*, 265 F.3d 1371, 1375, 60 USPQ2d 1272 (Fed. Cir.

2001).

The subject matter of claim 1 is the data storage structure which "stores and manages numerous (*e.g.*, several million) combinational-logic sub-networks...." *See, e.g.,* page 14, lines 6-8 of the Specification. The sub-networks are elements by which circuit manipulation functions and optimization routines are performed on an integrated circuit design. *See, e.g.,* page 14, lines 17-22 to page 15, lines 1-15 of the Specification. The sub-networks also identify efficient logic combinations for the desired functional output of an IC design. *See, e.g.,* page 15, lines 6-15 of the Specification. The sub-networks of claim 1 perform at least three output functions, for example as shown, in Figure 4 with outputs Y0, Y1, and Y2. *See also, e.g.,* page 21, lines 5-16 of the Specification. Furthermore, the specification discloses the storage of each sub-network through an index parameter derived from the output functions of the sub-network. By selecting a pivot function and specifying an input variable order based on the pivot function, an index value is generated by which the sub-network may be stored within the data storage structure. *See, e.g.,* page 30, lines 19-22 to page 31, lines 1-4 of the Specification.

Applicants respectfully submit that each term used in claim 1 is fully supported and described in the specification. As such, Applicants respectfully request reconsideration and withdrawal of the §112, second paragraph, rejection of claim 1.

III. Rejection to Claims 1, 3-7, 10 and 21

In the Office Action, the Examiner rejected claims 1 and 21 under §102(b) as being anticipated by Trimberger. The Examiner also rejected claims 3-7 and 10 under §103(a) as being unpatentable over Trimberger, as applied to the independent claim 1, in view of Pedersen. Claims 3-7, 10, and 21 are directly or indirectly dependent on claim 1. Claim 1 recites a

computer-readable medium encoded with a data storage structure. The data storage structure stores a group of sub-networks. Each sub-network performs at least three output functions. The data storage structure stores each sub-network indexed by a parameter derived from all output functions of the sub-network.

Applicants respectfully submit that Trimberger does not disclose, teach, or even suggest the data storage structure of claim 1 for at least the following three reasons. *First*, Applicants respectfully submit that Trimberger does not disclose, teach, or even suggest a data storage structure for storing sub-networks. Instead, Trimberger discloses conventional look up tables and general purpose Random Access Memory (RAM) modules which interchangeably store user data along with configuration data. *See*, Trimberger, column 6, lines 14-17 and 37-41.

In the Office Action, the Examiner cited figure 3, column 5, lines 59-67 and column 6, line 42 through column 7, line 28 of Trimberger to suggest a data storage structure for storing sub-networks. Applicants respectfully submit that the cited lines disclose nothing more than readily available look up table modules and standard Random Access Memory (RAM) modules and not a data storage structure.

Furthermore, none of the elements within the cited paragraphs by the Examiner stores sub-networks. In the Office Action, the Examiner stated that "a configurable logic block equips with memory to store logic functions...." Applicants respectfully submit that Trimberger does not disclose a data storage structure for storing sub-networks. The cited RAM modules store all types of generalized data, however, Trimberger does not disclose a data structure for storing sub-networks. Therefore, Applicants respectfully submit that Trimberger, neither in the paragraphs cited by the Examiner nor anywhere in the reference disclose a data storage structure for the storing of sub-networks.

Second, Trimberger does not disclose, teach, or even suggest storing a sub-network based on an index. In fact, Trimberger does not disclose using an index parameter to store any information at all. In the Office Action, the Examiner cited figure 3, column 5, lines 59-67 and column 6, line 42 through column 7, line 28 of Trimberger to suggest the storing of a sub-network based on an index generated by a sub-network output function. Applicants respectfully submit that the logic functions of Trimberger are not stored by an index. Trimberger discloses that these logic function are generated by logic function generators loaded with configuration data. *See*, Trimberger, column 6, lines 48-50. Trimberger, however, does not disclose storing the logic functions based on an index. Furthermore, the cited lines only state that user data is stored without disclosing an index parameter for storing the data. *See*, Trimberger, column 5, lines 59-62, "User data is data typically generated by the user logic and stored/retrieved in memory that could otherwise be used for configuration data storage". Therefore, Applicants respectfully submit that Trimberger does not disclose, teach, or even suggest the indexed storage of sub-networks within a data storage structure.

Third, Applicants respectfully submit that Trimberger does not disclose, teach, or even suggest an index parameter derived from all output functions of the sub-network. In the Office Action, the Examiner cited figure 3, column 5, lines 59-67 and column 6, line 42 through column 7, line 28 of Trimberger stating that the configurable logic block stores the control section output functions having the inputs for flip-flop inputs supplied by outputs of the lookup tables. Applicants respectfully submit that the Examiner has not stated how these output functions derive an index for the storage of a sub-network. The Examiner has not described how outputs from lookup tables being stored in flip-flops disclose deriving an index parameter from the output functions of the sub-network. In fact, Trimberger states that the outputs of the functions are stored only so that they may be passed to the next configuration for processing and not for

deriving an index parameter from the output of the functions. *See*, Trimberger, column 21, lines 57-59, "the states of the CLB outputs are stored automatically into the previously-described micro registers, thereby allowing parameters to be passed between configurations." Applicants respectfully submit that Trimberger does not disclose an index parameter derived from all the output functions of the sub-network.

In view of the foregoing remarks, Applicants respectfully submit that the cited references do not render claim 1 invalid. Given that claims 3-7, 10 and 21 are dependent on claim 1, Applicants respectfully submit that these claims be allowable over the cited reference for at least the same reasons that were provided above for claim 1. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1, 3-7, 10, and 21.

IV. Rejection to Claims 11-17 and 20

In the Office Action, the Examiner rejected claims 11 and 20 under §102(b) as being anticipated by Trimberger. The Examiner also rejected claims 12-17 under §103(a) as being unpatentable over Trimberger in view of Pedersen as applied to the independent claim 11. Claims 12-17 and 20 are directly or indirectly dependent on claim 11. Claim 11 recites a sub-network record management system that includes a data storage structure that stores a group of sub-networks. Each sub-network performs a set of output functions. The data storage structure stores each sub-network based on a parameter derived from the set of output functions of the sub-network. The parameter is used to retrieve the sub-network from the data storage structure. The sub-network record management system also includes a data access manager that identifies and retrieves sub-networks from the data storage structure.

Applicants respectfully submit that Trimberger does not disclose, teach, or even suggest the sub-network record management system of claim 11 for the following four reasons. *First*,

Applicants respectfully submit that Trimberger does not disclose, teach, or even suggest a sub-network record management system that has a data access manager that identifies and retrieves sub-networks from a data storage structure.

In the Office Action, the Examiner cited Figure 3 and column 6, line 42 through column 7, line 28 for specifying such a data access manager, "where the flip-flops of the configurable logic block access and retrieve the outputs of functional generators." *See*, Office Action, page 6. Figure 3 of Trimberger is a block diagram comprised of a pair of generic D-flip flops enabled via certain control signals fed by a pair of micro-registers which store the configuration data. Applicants respectfully submit that the flip-flops do not identify nor retrieve sub-networks from the data storage structure. Flip-flops are simple memory elements that store individual bits of data passed in from the input lines and do not disclose the identifying or retrieving of sub-networks. Therefore, Applicants respectfully submit that the Examiner has failed to identify how the cited Figure and paragraphs teach, suggest, or disclose a sub-network record management system that has a data access manager that identifies and retrieves sub-networks from a data storage structure.

Second, Applicants respectfully submit that Trimberger does not disclose, teach, or even suggest a data storage structure for storing sub-networks. Instead, Trimberger discloses conventional look up tables and general purpose Random Access Memory (RAM) modules which interchangeably store user data along with configuration data. *See*, Trimberger, column 6, lines 14-17 and 37-41.

In the Office Action, the Examiner cited figure 3, column 5, lines 59-67 and column 6, line 42 through column 7, line 28 of Trimberger to suggest a data storage structure for storing sub-networks. Applicants respectfully submit that the cited lines disclose nothing more than

readily available look up table modules and standard Random Access Memory (RAM) modules and not a data storage structure.

Furthermore, none of the elements within the cited paragraphs by the Examiner store sub-networks. In the Office Action, the Examiner stated that "a configurable logic block equips with memory to store logic functions...." Applicants respectfully submit that Trimberger does not disclose a data storage structure for storing sub-networks. The cited RAM modules store all types of generalized data, however, Trimberger does not disclose a data structure for storing sub-networks. Therefore, Applicants respectfully submit that Trimberger, neither in the paragraphs cited by the Examiner nor anywhere in the reference disclose a data storage structure for the storing of sub-networks.

Third, Trimberger does not disclose, teach, or even suggest storing a sub-network based on an index. In fact, Trimberger does not disclose using an index parameter to store any information at all. In the Office Action, the Examiner cited figure 3, column 5, lines 59-67 and column 6, line 42 through column 7, line 28 of Trimberger to suggest the storing of a sub-network based on an index generated by a sub-network output function. Applicants respectfully submit that the logic functions of Trimberger are not stored by an index and are only generated by logic function generators loaded with configuration data. *See*, Trimberger, column 6, lines 48-50. Furthermore, the cited lines only state that user data is stored without disclosing a generated index parameter for storing the data. *See*, Trimberger, column 5, lines 59-62, "User data is data typically generated by the user logic and stored/retrieved in memory that could otherwise be used for configuration data storage". Therefore, Applicants respectfully submit that Trimberger does not disclose, teach, or even suggest the indexed storage of sub-networks within a data storage structure.

Fourth, Applicants respectfully submit that Trimberger does not disclose, teach, or even suggest an index parameter derived from all output functions of the sub-network. In the Office Action, the Examiner cited figure 3, column 5, lines 59-67 and column 6, line 42 through column 7, line 28 of Trimberger stating that the configurable logic block stores the control section output functions having the inputs for flip-flop inputs supplied by outputs of the lookup tables. Applicants respectfully submit that the Examiner has not stated how these output functions derive an index for the storage of a sub-network. The Examiner has not described how outputs from lookup tables being stored in flip-flops disclose deriving an index parameter from the output functions of the sub-network. In fact, Trimberger states that the outputs of the functions are stored only so that they may be passed to the next configuration for processing and not for deriving an index parameter from the output of the functions. *See*, Trimberger, column 21, lines 57-59, "the states of the CLB outputs are stored automatically into the previously-described micro registers, thereby allowing parameters to be passed between configurations." Applicants respectfully submit that Trimberger does not disclose an index parameter derived from all the output functions of the sub-network.

In view of the foregoing remarks, Applicants respectfully submit that the cited references do not render claim 11 invalid. Given that claims 12-17 and 20 are dependent on claim 11, Applicants respectfully submit that these claims be allowable over the cited references for at least the same reasons that were provided above for claim 11. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 11-17 and 20.

V. New Claims 22-23

In this Amendment, Applicants have added new claims 22-23. Applicants respectfully submit that claims 22-23 are fully supported by the specification. Accordingly, Applicants respectfully submit that claims 22-23 are in condition for allowance.

VI. Allowed Claims

The Examiner has objected to claims 8-9 and 18-19 as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all limitations of the base claim and any intervening claims. Applicants thank the Examiner for the allowance. Applicants, however, believe that the base claims are patentable for the reasons given above. Accordingly, Applicants have not re-written these claims in independent form.

CONCLUSION

In view of the foregoing, it is submitted that all pending claims, namely claims 1 and 3-23 are in condition for allowance. Reconsideration of the rejections and objections is requested. Allowance is earnestly solicited at the earliest possible date.

Respectfully submitted,

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